

erected; and the staves being ready, all of one dimension, and the screw-pins all of a size, the arch might be sprung in a few days, breaking joint, as in Fig. VII. Thus each flange and rib would butt upon its neighbour, and the screw-pins confining the whole, it would become like one solid segment of a cylinder one foot thick, *extending into the piers.*

By this mode, the difficulties which arise in fitting diagonal, perpendicular and lateral braces, are avoided, the top plate performing the office of all such braces; which top-plates, in other compositions, have no tendency to strengthen: thus every particle is applied to resistance, and the materials have but few joinings; which junctions have also broad and permanent bearings of one foot on each other, the flange and ribs being cast of that depth. Thus, I conceive, a bridge of one hundred feet, or perhaps one hundred and fifty feet span, might be erected at a cheap rate, with a small quantity of materials, yet with the prospect of great durability. If I suppose a bridge one hundred feet span, thirty wide, with the top plate one inch thick, five flanges or ribs, each one foot broad and two inches thick, the whole weight of the arch would not be more than seventy-eight tons, allowing one pound to every four cube inches of cast-iron.

So far relates to iron bridges of one hundred or one hundred and fifty feet span; but should it be necessary to extend them to a greater length, to say three hundred feet, two segments would then be requisite; the first, as in Fig. VI. as the principal support; the second, to ease the passage, should be of such a bend as would admit an easy ascent and descent; and, by being part of a curve, it also tends to strengthen; thus, if I say, span three hundred feet, the first spring thirty, the second spring only ten feet, they both must be

be compressed into freight lines, before they can come down; they will also have twenty perpendicular feet of bearing on the butment, the bearings opposite to the two segments being opposed by segments entering the butments, as before described; the two segments must be kept asunder by perpendiculars in the haunches, placed at about ten feet distance from each other, as in the Figure. See Plate XV. exhibiting the combination by ribs and braces; also Plate XVI. representing the arch of staves.

Having exhibited the mode of construction, I conceive it unnecessary to comment on the particular formation, or to draw a comparative view of this and other bridges of iron; as in cases where they may be required; the artist will weigh the various circumstances, investigate the several modes of building, and choose for himself; in which there is a leading deliberation, viz. By what means can a given quantity of materials be arranged, so as to incur the least expence in erecting, and be rendered most permanent; and by which mode will the least materials answer the purpose?